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09/778,144	02/07/2001	Thomas Hodge	A33942; 070337.0237	8595

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EXAMINER

HU, HENRY S

ART UNIT	PAPER NUMBER
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1713

DATE MAILED: 04/25/2003

9

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/778,144

Applicant(s)

HODGE, THOMAS

Examiner

Henry S. Hu

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 January 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) 13-24 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 February 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 7. 6) ☐ Other:

DETAILED ACTION

1. It is noted that USPTO has received an amendment as paper No. 8 filed on January 3, 2003 under CFR 1.121(C). The paragraphs beginning on page 10 at line 16, page 19 at line 18, page 22 at line 2, and page 23 at line 13 are replaced with new paragraphs, the examiner thereby withdraws the specification objections. **No Claims are amended.** Claims 1-24 are pending now.

In response to **key argument presented by Applicants on the difference between the pneumatic tires for passenger car and the tires for heavy vehicle**, the examiner thereby withdraws all 102 and 103 rejections on the first action (paper No. 6) filed on July 31, 2002 including following claim rejections: (A) under 35 U.S.C. 102(e) as being anticipated by Araki et al. (US 6,177,503) for Claims 1-6, 8 and 10-11, (B) under 35 U.S.C. 103(a) as being unpatentable over Araki et al. (US 6,177,503) as applied to claims 1 and 6 above, and further in view of Agostini et al (US 5,674,932) for Claims 7 and 10, (C) under 35 U.S.C. 103(a) as being unpatentable over Araki et al. (US 6,177,503) as applied to claim 1 above, and further in view of Loiselle (US 5,989,719) for Claims 9 and 12, (D) under 35 U.S.C. 103(a) as being unpatentable over Mahmud et al. (US 6,028,137) in view of Araki et al. (US 6,177,503) and Cabioch et al. (US 6,013,718) for Claims 1-6, 8-9 and 11-12, and (E) under 35 U.S.C. 103(a) as being unpatentable over Mahmud et al. (US 6,028,137) as applied to claims 1 and 6 above, and further in view of Agostini et al (US 5,674,932) for Claims 7 and 10. A new action follows.

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2. **Applicant's election with traverse of Group I, Claims 1-12 in Paper No. 8 filed on January 3, 2003 is acknowledged.** The traversal is on the ground(s) that it is submitted that it would not place an undue burden to search and examine the non-elected Group II, Claims 13-24 with those of Group I. This is not found persuasive because Group II is drawn to a technology apparently requiring search on different classification area including process of making the cross-linked rubber composition of group I.

The requirement is still deemed proper and is therefore made **FINAL**.

This application contains claims 13-24 drawn to an invention nonelected with traverse in Paper No. 8. A complete reply to the final rejection must include **cancellation of nonelected claims** or other appropriate action (37 CFR 1.144) See MPEP § 821.01.

Applicant is reminded that if claims directed to the product are elected, and a product claim is subsequently found allowable, withdrawn process claims which depend from or otherwise include all the limitations of the allowable product claim will be rejoined. See M.P.E.P. § 821.04.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this

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subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

The limitation of Claim 1 in present invention relates to a heavy-vehicle tire comprising a tread which is formed from a cross-linked rubber composition, the composition comprising: (a) An elastomeric matrix comprising a diene elastomer having one or more of its chain ends a function group which is active for coupling to a reinforcing white filler, (b) A reinforced filler comprising a reinforced white filler in at least 50 wt% of total filler, and (c) A bonding agent for polymer and white filler. See other limitations of Claims 2-12.

4. Claims 1-6, 8 and 11 are rejected under 35 U.S.C. 102(e) as being anticipated by Araki et al. (US 6,177,503) as evidenced by Micouin et al. (US 6,191,205).

Regarding the limitations of Claims 1-3, 6, 8 and 11, Araki et al. disclose a rubber composition for the **tread of tire** (column 13, line 7-8), and the composition comprising: (a) A diene based rubber including a diene copolymer (Tg -60 °C or higher) of 1,3-butadiene and styrene (15-30 wt%), and the copolymer has been treated by coupling at chain ends with a coupling agent (column 5, line 54-column 6, line 60). (b) A silica filler (20-100 phr of rubber) (abstract, line 16, column 6, line 61 to column 7, line 9) is used with carbon black (0-100 phr of rubber). (c) A specific silane coupling agent such as bis(alkoxysilylalkyl) polysulfide (column 7, line 32-56). Araki et al. further disclose the rubber composition is applicable to pneumatic tires.

5. With respect to the limitation of **“tread for heavy-vehicle tires”** in Claim 1, Micouin et al. disclose a **materially the same diene rubber composition** which is made from an **end-group functionalized diene copolymer** (particularly see column 8, line 48-50) (column 7, line 59 - column 8, line 50), **silica filler** (column 2, line 17 - column 4, line 13), and a specific silane coupling agent such as **polysulfur organosilane, marked by Degussa under the name of X 50S** (column 10, line 53-55; column 12, line 40). Micouin et al. further disclose such silica-based rubber composition can be employed for the manufacture of tire components such as **treads for both passenger-car tires and heavy-vehicle tires** due to improved resistance to rolling (column 1, line 7-21). Therefore, Claim 1 is anticipated by the disclosure of Araki et al. since Araki's composition can be applied for making the tread of passenger-car pneumatic tires and heavy-vehicle tires as evidenced by Micouin.

6. Regarding Claims 4 and 5, Araki et al. disclose that the copolymer has been treated by coupling at chain ends with a coupling agent containing silicon such as silicon tetrachloride or a coupling agent containing alkoxysilane (column 5, line 54-column 6, line 60). Since end group with silicon chloride or alkoxysilane when hydrolyzed is equivalent to end group with silanol for sol-gel condensation, thereby, Claims 4 and 5 are anticipated over Araki et al. Therefore, the limitations of Claims 1-6, 8 and 11 are anticipated by Araki et al.

7. Claims 1-3 and 6-9 are rejected under 35 U.S.C. 102(e) as being anticipated by Micouin et al. (US 6,191,205).

Regarding the limitations of parent Claim 1, Micouin et al. disclose a **diene rubber composition** which is made from an **end-group functionalized diene copolymer** (particularly see column 8, line 48-50) (column 7, line 59 - column 8, line 50), **silica filler** (column 2, line 17 - column 4, line 13), and a specific silane coupling agent such as **polysulfur organosilane, marked by Degussa under the name of X 50S** (column 10, line 53-55; column 12, line 40). Micouin et al. further disclose such silica-based rubber composition can be employed for the manufacture of tire components such as **treads for both passenger-car tires and heavy-vehicle tires** due to improved resistance to rolling (column 1, line 7-21). Therefore, Claim 1 is anticipated by the disclosure of Micouin et al.

8. Regarding Claim 2, Micouin et al. disclose copolymers of butadiene-styrene (column 8, line 22) and butadiene-styrene-isoprene (column 8, line 35) are used.

Regarding Claim 3, the disclosure about copolymers of butadiene-styrene (column 8, line 22) and butadiene-styrene-isoprene (column 8, line 35) by Micouin et al. sets forth the limitation of vinyl content and glass transition temperature (column 8, line 10-47).

Regarding Claims 6 and 7, the disclosure of silica filler by Micouin et al. on column 2, line 17 - column 4, line 13 sets forth the limitation of Claims 6 and 7 on amount used and the CTAB value (column 2, lines 20 and 35 and 38).

Remaining Claims 8 and 9 are thereby rejected with the above rejection for Claim 1.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 1-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vasseur et al. (US 5,871,597) in view of Araki et al. (US 6,177,503).

Regarding the limitation of Claim 1, Vasseur et al. disclose a rubber composition is useful for the **crown reinforcement** located between the carcass and the tread of tire (title; abstract, line 1-4). The rubber composition comprising: (a) A diene based rubber including **diene copolymers of diene unit (99-20 wt%) and styrene (1-80 wt%)**, and the copolymer has been treated by **coupling at chain ends with a coupling agent for functionalization** (column 3, line 47 – column 4, line 28). (b) A silica filler having a CTAB value less than 125 m²/g and a BET specific surface area less than 125 m²/g (abstract, line 6-8; column 2, line 66 -column 3, line 7). (c) A specific silane coupling agent such as polysulfur organosilane used as bonding agent (c) in Table I (column 4, line 34-35; column 6, line 52 and 64). Vasseur et al. further

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disclose the composition is applicable to all types of radial carcass tires, that is to say **passenger car tires, van tires, heavy vehicle tires and airplane tires** (column 5, line 44-46).

11. Vasseur is silent about using the cross-linked diene rubber composition for making tread of tire. Araki et al. teach a rubber composition can be made from an end-group functionalized diene copolymer (column 5, line 54-column 6, line 60), silica filler (abstract, line 16, column 6, line 61 to column 7, line 9), and a specific silane coupling agent such as bis(alkoxysilylalkyl) polysulfide (column 7, line 32-56), the advantage is such a composition is good for making tread of tire, which shows improved uniformity and abrasion resistance (abstract, line 20-21; column 13, line 7-8).

In light of the fact that both Vasseur and Araki have materially the same diene rubber composition, it would have been obvious to one having ordinary skill in the art to apply Vasseur's cross-linked diene rubber composition for making tread of tire as taught by Araki. One advantage is such a composition can provide improved uniformity and abrasion resistance, and the other advantage is **such obtained tread in the tire will be more compatible with the connecting crown reinforcement part which is also made with the same rubber composition by Vasseur, thereby a tire having better performance may be obtained with such compatible combination.**

12. Regarding Claims 2 and 3, the various diene elastomer rubbers disclosed by Vasseur from column 3 at line 47 to column 4 at line 28 set forth the limitation of Claims 2 and 3.

Regarding Claims 6 and 7, the amount of silica used in Examples 1-3 and shown in Tables I and III set forth the limitation of Claims 6 and 7.

Regarding Claims 8 and 9, a specific silane coupling agent such as polysulfur organosilane, marketed by Degussa under the name **SI 69** is used as bonding agent (c) in Tables I and III by Vasseur (column 4, line 34-35; column 6, lines 52 and 64).

13. Regarding Claims 4-5 and 10-12, Vasseur is silent about using a silanol group or a polysiloxane block having a silanol end as the functional end-group of diene elastomer. Araki et al. teach diene copolymer can be coupled at chain ends with a coupling agent containing silicon such as silicon tetrachloride or a coupling agent containing alkoxysilane (column 5, line 54-column 6, line 60), the advantage is **such endgroup-functionalized diene rubbers have a large affinity with silica and can be couple together** (column 6, line 59-60). Therefore, it would have been obvious to one having ordinary skill in the art to use an end-functionalized diene rubber made from a coupling agent containing silicon such as silicon tetrachloride or a coupling agent containing alkoxysilane as taught by Araki. The advantage is when such end-functionalized diene rubbers are mixed with silica filler, **a cross-linked composition can be obtained from the affinity and coupling between rubber and silica since the both contact surfaces carrying the same silanol groups**, thereby a tire having better performance may be obtained with such combination.

14. Claims 7 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Araki et al. (US 6,177,503) as evidenced by Micouin et al. (US 6,191,205) and in view of Agostini et al (US 5,674,932).

Regarding Claims 7 and 10, Araki et al. use silica filler but are silent on the **CTAB value of silica**, although Araki et al. disclose that the various silica used in the disclosure are not limited to the examples mentioned from column 6, line 61 to column 7, line 8.

Araki et al. and Agostini et al. are analogous art since they are both involving rubber composition with silica filler.

15. Since Araki et al. genetically disclose various silica are used and Agostini et al. specifically teach the silica may be expected to have a CTAB surface area in a range of about 100 to about 220 (column 14, line19-21). Therefore, one having ordinary skill in the art would expect the silica disclosed by Agostini et al. would function properly as filler in Araki et al.'s composition because one having ordinary skill in the art would expect **all the species of a known genus to work satisfactorily**.

16. Claims 9 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Araki et al. (US 6,177,503) as evidenced by Micouin et al. (US 6,191,205) and in view of Loisel (US 5,989,719).

Regarding Claims 9 and 12, Araki et al. disclose that the various silica used in the disclosure are not limited to the examples mentioned from column 6, line 61 to column 7, line 8. The difference between the disclosure of Araki et al. and the present invention is that Araki et al.'s silence on the use of alkyl alkoxysilane covering agent for silica.

17. Araki et al. disclose the diene based polymers which are modified in the chain ends with coupling agent such as dialkyldialkoxysilanes, monoalkyltrialkoxysilanes, or monoalkyltriaryloxysilanes, will improve processability and have a large affinity with silica (column 6, line 42-60). Loiselte teaches a heat curable liquid silicone rubber composition comprising vinyl-containing polydiorganosiloxane and organohydrogensiloxane, will improve hydrocarbon oil resistance. Therefore, by using Araki's disclosure on modified diene based polymer to modify the silica with the same alkylalkoxysilanes, thereby will improve the affinity with the Araki's modified diene based polymer and will result a oil-resistant final product.

Araki et al. and Loiselte are analogous art since they are both involving rubber composition with silica filler.

18. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the cross-linked rubber composition disclosed by Araki et al. with an alkylalkoxysilane-modified silica using the same alkylalkoxysilanes which are used to modify Araki's diene based polymer, thereby to improve the affinity and processability between the polymer and silica, and to obtain better oil-resistance as taught by Loiselte, in order to obtain the

claimed composition useful as a cross-linked rubber composition for the tread of a tire for bearing heavy loads and thereby obtain the present invention.

19. Claims 4-5 and 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Micouin et al. (US 6,191,205) in view of Araki et al. (US 6,177,503).

The discussion of the disclosures of the prior art of Micouin et al. for Claims 1-3 and 6-9 of this office action is incorporated here by reference. Regarding Claims 4-5 and 10-12, Micouin is silent about using a silanol group or a polysiloxane block having a silanol end as the functional end-group of diene elastomer. Araki et al. teach diene copolymer can be coupled at chain ends with a coupling agent containing silicon such as silicon tetrachloride or a coupling agent containing alkoxysilane (column 5, line 54-column 6, line 60), the advantage is **such endgroup-functionalized diene rubbers have a large affinity with silica and can be couple together** (column 6, line 59-60).

Therefore, it would have been obvious to one having ordinary skill in the art to use an end-functionalized diene rubber made from a coupling agent containing silicon such as silicon tetrachloride or a coupling agent containing alkoxysilane as taught by Araki. The advantage is when such end-functionalized diene rubbers are mixed with silica filler, **a cross-linked composition can be obtained from the affinity and coupling between rubber and silica since the both contact surfaces carrying the same silanol groups**, thereby a tire having better performance may be obtained with such combination.

Conclusion


20. The prior art made of record and not relied upon is considered pertinent to applicants' disclosure. The following references relate to a heavy-vehicle tire comprising a tread, which is formed from a cross-linked rubber composition:

US Patent No. 5,420,193 to Matsue et al. disclose a diene-based rubber composition for making the tread for **heavy duty vehicle pneumatic tires** (title; abstract, line 1-10). The composition comprises a polybutadiene rubber, filler and bonding agent (column 6, line 1-15). No endgroup-functionalized diene rubber is disclosed. Therefore, Matsue fails to teach present invention.

21. Any inquiry concerning this communication or earlier communication from the examiner should be directed to Henry S. Hu whose telephone number is (703) 305-4918. The examiner can be reached on Monday through Friday from 9:00 AM –5:00 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu, can be reached on (703) 308-2450. The fax number for the organization where this application or proceeding is assigned is (703) 746-9051. Any inquiry of general nature or relating to the status of this application or proceeding should be directed to the group receptionist whose telephone number is (703) 308-0661.


Henry S. Hu

April 17, 2003


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